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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/744,212	03/07/2001	Jyoti Kiron Bhardwaj	WLJ.071	4027

7590 12/24/2002  
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EXAMINER

DEO, DUY VU NGUYEN

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 12/24/2002

7

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/744,212

Applicant(s)

BHARDWAJ, JYOTI KIRON

Examiner

DuyVu n Deo

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on amendment filed 3/7/01.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-38 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 March 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 6.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 2, 4-6, 9, 10, 14-20, 25 are rejected under 35 U.S.C. 102(b) as being anticipated by Okano et al. (US 4,529,475).

Okano describes an etching method for comprising cyclically (col. 6, line 35-45) performing the steps: etching a material (col. 4, line 46-51); depositing a passivation layer on the surface of the etched feature (col. 4, line 51-60); selectively removing the passivation layer from the etched feature by light beam in order that the etching proceeds in a direction perpendicular to the material (col. 4, line 61-65).

At least one of step etching or depositing is performed in the absence of plasma and a resist mask is used for etching (col. 2, line 52-53; col. 3, line 68). The etched material would include silicon, polysilicon, silicon nitride, W that would depend on what stage of the integrated circuit being processed (col. 1, line 7-10; col. 3, line 65). The etching gas includes chlorine (col. 4, line 46).

Referring to claim 16, the polymer would be of the formula since the gases using contains C and F such as  $\text{CClF}_3$  (claimed precursor) (col. 7, line 50-61). Referring to claim 17, the light

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beam used for depositing would read on claimed photo-enhanced polymerization (col. 5, line 24-45).

3. Claims 37, 38 are rejected under 35 U.S.C. 102(b) as being anticipated by Seaver et al. (US 4,748,043).

Seaver describes a vapour delivering apparatus comprising a plate 14 which is covered with insulating film (claimed dielectric body) within which are positioned a plurality of needles (or nozzles), each needle extending from the back to the front side of the plate, the needles is stainless steel (claim body is metallized) to form a continuous electrical path between the back to the inside and to the tip of each needle (col. 4). The apparatus comprises electrical connections from a high voltage supply (power supply) to the needles.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 3, 7, 8, 11-13, 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Okano.

Referring to claim 3, step of depositing using a plasma or energetic radiation (absent of plasma) is well known to one skilled in the art as discussed in page 3 of the specification.

Therefore, at the time of the invention, using a plasma would have been obvious in order to deposit a passivation layer with a reasonable expectation of success.

Referring to claims 7, 8, 11, and 12, using metal Au or Pt would have been obvious because Okano also describes metal can be etched and it would depend on type of integrated circuit being formed. Using aqua regia for Au or Pt and a solution such as HF and alcohol for etching silicon is well known and obvious to one skilled in the art, depending the material is being used, in order to etch the material with a reasonable expectation of success (specification, page 4, line 10-19).

Referring to claims 21, 23, the ion energy such as 10eV would have been obvious to be determined through test runs and the etching gases (col. 5, line 63-66) would be capable of physically removing the passivation layer with chemical enhancement.

Referring to claim 13, using nitrogen for purging between steps or as a gas carrier is well known to one skilled in the art (please see cited arts below).

Referring to claim 26, etching metallic material at elevated T using etchant such as diketone is well known to one skilled in the art at the time of the invention as shown here by Roberts (col. 7, line 27-68).

6. Claims 1-10, 14-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laermer et al. (US 5,501,893) and admitted prior art.

Laermer describes an etching method for comprising repeatedly performing the steps: etching a material using a plasma (col. 3, line 68); depositing a passivation layer on the surface of the etched feature (col. 4, line 26); selectively removing the passivation layer from the etched

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feature in order that the etching proceeds in a direction perpendicular to the material (col. 4, line 54-56). Unlike claimed invention, Laermer doesn't describe at least one of steps etching and depositing is performed in the absent of a plasma. However, other alternative ways of etching such as wet or vapor etching, using HF and alcohol, and depositing such as a plasma or energetic radiation (absent of plasma) is well known to one skilled in the art as discussed in pages 1, 3, and 4 of the specification. Therefore, at the time of the invention, using other technique for etching including wet, vapor etching or depositing such as energetic radiation (absent of plasma or photo-enhanced polymerization) would have been obvious in order to etch a substrate and deposit a passivation layer with a reasonable expectation of success.

Referring to claim 16, the polymer would be of the formula since the gases using contains C and F such as CHF<sub>3</sub> (claimed precursor). Referring to claim 18-20, page 4 of specification further describes the photo-enhance polymerization and by means of irradiation which are known and practiced by one skilled in the art. Referring to claims 21, 23, the ion energy such as 10eV would have been obvious to be determined through test runs and the etching gases (col. 6, line 11-20) would be capable of physically removing the passivation layer with chemical enhancement.

7. Claims 27-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Laermer et al. (US 5,501,893).

Laermer describes an apparatus for processing a substrate comprising a chamber having a chemical inlet 22 (figure 1); a support 12 (claimed first electrode) for receiving a substrate (figure 1); means for etching (col. 4, line 1-25); means for depositing a passivation layer (col. 4,

line 25-32); and means for selectively removing the passivation layer from the etched feature (col. 5, line 36-54). Even though Laermer is silent about the chemical outlet; however, there must be a chemical outlet in order to remove the chemical and product reaction from the etching and deposition.

The apparatus comprises means for providing microwave or RF energy to the plasma (col. 4, line 1-11), electrical bias is provided to the support to accelerate ions onto the substrate (col. 4, line 7-15), and mean for controlling substrate T (col. 5, line 65-col. 6, line 10).

8. Claims 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Seaver et al. (US 4,748,043).

Seaver describes an electrospray coating process wherein he describes feeding a solution into the chamber by creating droplets on entering the chamber, and generating an electrostatic field to electrostatically attract the droplets to the substrate. The droplets are provided with a charge by means of high voltage power supply connected to a droplet inlet point (col. 5). Unlike claimed invention, Seaver doesn't describe a solution for etching; however, it would be obvious that depending on the solution being used, the method can be for etching. Therefore, it would have been obvious at the time of the invention for one skilled in the art that depending on the step of the process being done, the method can be used for etching in order to provide a substrate with a reasonable expectation of success.

Referring to claim 36, since the electrostatic field strength is a result-effective variable, it would have been obvious for one skilled in the art to determine the strength of the field through routine experimentation in order to achieve the optimum strength for attraction of the droplets to the substrate a reasonable expectation of success.

9. Blackwood et al. (US 4,749,440), col. 4, line 68-col. 5, line 2, and Cleavelin et al. (Semiconductor International Nov. 1987), pg 96, are cited to show prior art.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DuyVu n Deo whose telephone number is 703-305-0515.

DVD  
December 19, 2002



ROBERT KUNEMUND  
PRIMARY EXAMINER